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quite as abundantly as it did that year at San Pedro. During the last days of July the water of the ocean at Coronado extending from the shore out to a mile or more took on the rusty color, increasing at times and in places to almost that of old blood clot, with which we became so familiar at San Pedro two years ago. This year, however, we observed nothing of the fatality among other animals, as an accompaniment of the visitation, that occurred in 1901. It is not certain, however, that this latter phenomenon was absent, for we did not have the same opportunities for observation this year that we had before. This year we did no dredging in the affected region and consequently had no chance to see how the bottom organisms were affected. Furthermore, there was no high wind this year to drive the *Gonyaulax* on to the shore and to cast up the dead of other animals, had they existed.

As mentioned above, the same kind of work will be carried on again for two weeks during the Christmas recess of the university. This much we are now able to do toward realizing the plan of distributing the survey operations throughout the year.

It gives me genuine pleasure to conclude with an acknowledgment of our obligations to the citizens of San Diego for having made the work possible this year. The whole expense of moving the laboratory from San Pedro and of fitting up the new one at Coronado, and likewise all the expense of carrying on the work excepting for the equipment that was taken from the university, was provided by the citizens. A committee of the chamber of commerce of that city had the matter in charge, and such a duty was certainly never more efficiently discharged by any similar body of men.

WM. E. RITTER.

UNIVERSITY OF CALIFORNIA,
August 14, 1903.

SCIENTIFIC BOOKS.

THE COLLECTED PAPERS OF ROWLAND AND FITZGERALD.

The Physical Papers of Henry Augustus Rowland. Collected for publication by a Committee of the Faculty of the University. Baltimore, The Johns Hopkins Press. 1902. 8vo. Pp. xi + 704.

The Scientific Writings of the Late George Francis FitzGerald. Collected and edited with a historical introduction by Joseph Larmor. Dublin University Press Series. Dublin, Hodges, Figgis & Co., Ltd.; London, Longmans, Green & Co. 1902. 8vo. Pp. lxiv + 576.

No more fitting memorials could have been produced in honor of the two distinguished physicists, whose untimely deaths occurred in the early months of 1901, than these admirable volumes issued by the Johns Hopkins Press and by the Dublin University Press respectively. The first duty of the living, therefore, is to acknowledge our deep indebtedness to Professor Ames and to Professor Larmor on whom the burden of the work fell in collecting and editing these widely scattered papers and in bringing them into readily accessible forms in the short space of two years. They have thus at once rendered homage to the heroes who have gone before and encouragement to the hosts who follow in the arduous march of physical science. The desirability of republication of the scattered papers of eminent men of science is now pretty generally recognized, and the prompt issue of the papers of Rowland and FitzGerald sets an example which should be widely followed.

The nearly simultaneous appearance of these two volumes tends to emphasize a remarkable similarity in the careers of Rowland and FitzGerald. Each was the son of a clergyman; each was a physicist by nature in spite of all educational influences that might have led his thoughts along other lines; each was in the van of the great progress in physical science of the last thirty years; each was a vigorous champion of the laboratory method in scientific studies; each advocated in the strongest terms the merits of pure re-

search; and each sacrificed himself, we might almost say, in his unflagging efforts for the advancement of science.

The appearance of the volumes recalls attention, also, to the singular fatality which has prevailed in the ranks of the leaders in electro-magnetic science. Maxwell, Hertz, FitzGerald and Rowland all fell while yet in the prime of life. Were they victims to overwork, or did they sap their vitality in their early struggles for the recognition essential to secure them the means of subsistence? Possibly there is more truth than poetry in Rowland's question in his address on 'The Highest Aims of the Physicist'—'Where can the discoverer in science earn more than the wages of a day laborer or cook?' No doubt each of them had to do combat with many obstacles other than those which nature sets up in the way of learning her laws, for society does not appear to have discovered any method as yet to prevent the waste of effort involved in surmounting such obstacles. Society, indeed, seems to be almost wholly unconscious of the value to itself of its most important members. Our best known and most applauded heroes of state are still those who win renown by shedding human blood. Nevertheless, Rowland and FitzGerald lived during a period of great progress toward a higher civilization than that into which they were born. Each of them contributed nobly and effectively to that progress, and the scientific world, at least, gave them its heartiest encomiums.

As indicated by the title, the volume of Rowland's papers contains reprints only of those devoted especially to physical subjects, although the bibliography included in the work embraces all of his published papers. The preface and table of contents of the volume are followed by the capital commemorative address of Dr. Mendenhall, read before an assembly of friends at Baltimore, October 26, 1901. The many interesting facts and incidents from Rowland's career related in this address would tempt one to quote freely from it if it had not been published already in this journal.*

* 'Henry Augustus Rowland': T. C. Mendenhall. SCIENCE, N. S., December 6, 1901. Pp. 865-877.

The papers are arranged in groups under the following heads: Part I., 'Early Papers'; Part II., 'Magnetism and Electricity'; Part III., 'Heat'; Part IV., 'Light.' Then follow a list of addresses, six in number; a full bibliography, embracing 72 titles; and a description, with suitable plates, of the dividing engines devised by Professor Rowland. The latter description and plates were prepared by Professor Ames, Professor Rowland having left no records with respect to these machines.

Two lifelike portraits of Professor Rowland are included in the volume; and it is hardly necessary to add that so fine a memorial and so good a specimen of book-making is supplemented by an adequate index.

The text of FitzGerald's papers is preceded by a most interesting and instructive account of his life drawn from communications to the *Electrician* and to the 'Obituary Notices of the Royal Society' by Principal O. J. Lodge; to *Nature* by Dr. Larmor; to the *Proceedings of the Institution of Electrical Engineers* by Professor F. T. Trouton, and to the *Physical Review*; embracing in all pp. xx-lxiv. These reveal not only a man of remarkable originality and versatility in science, but a man also of the gentlest and broadest sympathies. Few men in any sphere of intellectual activity have been so generally esteemed with affectionate regard by their contemporaries.

The papers are arranged in the chronological order of their first publication. There are 108 of them, the first having been published in 1876. They touch a wide range of subjects, and although some of them are condensed to the merest abstracts they are generally bristling with clear ideas and fruitful suggestions.

Amongst the most useful as well as most interesting of these writings are his reviews and semi-popular addresses. The latter, especially, deserve to be widely read, since they are luminous with the spirit of progress of our age, not only for the small number of scientific specialists but for the whole human race. In what he has to say about 'Universities and Research,' No. 60, 'Science and Industry,' No. 77, 'Lord Kelvin's Researches,' No. 78, 'The Applications of Science,' No. 95,

he proves himself a prophet and a statesman in the best senses of the words, as well as an eminent representative of natural philosophy.

The editor has properly anticipated that the volume will be much consulted, and he has supplied an index which will prove particularly useful to those not already acquainted with the scope of importance of FitzGerald's writings. An excellent portrait accompanies the volume as a frontispiece.

R. S. W.

Lehrbuch der vergleichenden Anatomie. By B. HALLER. Erste Lieferung. Jena, Gustav Fischer. 1902.

This book, the first portion of which is here considered, is intended by the author to fill the gap left vacant by the aging of Gegenbaur's 'Grundriss der vergleichenden Anatomie,' a book familiar enough to the older generation of zoologists, but now almost unknown, its last edition having appeared some twenty-five years ago.

The 'Grundriss' was what its title denotes, a comparative anatomy as contrasted with a zoology, or, in other words, a concise exposition of the various systems of organs in their modifications and adaptations throughout the animal kingdom, rather than a description of the morphological characteristics of the various classes of animals. That such a book, brought up to date, would fill a gap in our zoological literature there can be no doubt, but that the volume before us does so is more than questionable. For it is a compromise; it is a zoology as far as its general plan is concerned, and a comparative anatomy only so far as each great zoological group is concerned. Its plan is essentially the same as that of Lång's 'Lehrbuch,' though on a less extensive scale, and because it is less detailed the defects of the plan are all the more pronounced.

And even more to be criticized is the classification which has been adopted for the achordata, which alone are treated in the portion of the book before us. The recognition of a group Vermes, including the platyhelminths, nemathelminths, rotifera, chætognaths and annelids, and a group Arthropoda including

crustaceans, arachnids, protracheates and tracheates as of equal value with a group Bryozoa and a group Brachiopoda, not only indicates a depressing lack of taxonomic perspective but leads the student to erroneous conceptions of the affinities of the invertebrate phyla, thereby depreciating one of the prime values of comparative anatomy.

The contents of the book, apart from these general defects, are on the whole good and cover the proposed ground as completely as could well be expected within the limits set. They may, however, be criticized for a lack of clearness, attributable to a certain extent to the unfortunate arrangement of topics and for occasional errors of statements. Among the latter may be mentioned the description of the mesenterial filaments of the Anthozoa as 'finger-shaped processes' arising from the edges of the mesenteries, an error repeated in the figure illustrating the structure of an Anthozoan, and the rather scant reference to the coxal glands of the Xiphosura and arachnids as integumental organs.

The figures are numerous and on the whole well chosen and admirably reproduced. The text, however, awakens wonderment by the extraordinary number of typographical errors which it contains. The technical terms offend especially in this respect, though by no means exclusively, and though it would be an exaggeration to say that an error occurs on almost every other page, one cannot help wondering how the proof-readers could have allowed so many flagrant errors to escape notice. Achordaten (Achordaten), Hiozoen (Heliozoen), Mikrocoma, Hyppocrane (Hippocrene) and Pachyrehina are hardly *recognizable in such novel guises and *Paramæcium* masquerades as *Paramætium*, *Parametium* and *Paramatium*. But disturbing as these examples may be, it gives one an actual shock to find *Loxosoma* quoted as a multinucleated infusorium, *Idotea* as an opisthobranch mollusk, and after reading a paragraph concerning the Phronimidæ to discover that the author is really talking about the Phoronidæ. There is probably an explanation for such remarkable errors, but there cannot be a valid excuse for them.

With all these defects the book is hardly one to be recommended to the young student. It would almost be better for him to hunt up the time-honored 'Grundriss.'

J. P. McM.

SOCIETIES AND ACADEMIES.

THE AMERICAN POMOLOGICAL SOCIETY.

THE American Pomological Society held its twenty-eighth biennial meeting at Boston on September 10, 11 and 12. Among the papers on the program were, in addition to the address of the president, Professor Charles Watrous, of Des Moines, Ia., the following:

DR. L. H. BAILEY, Cornell University, Ithaca, N. Y.: 'The Attitude of the Schools to Country Life.'

MR. J. HORACE MCFARLAND, Harrisburg, Pa.: 'Fruit Gardens, what they are and what they are for.'

PROFESSOR S. B. GREEN, St. Anthony Falls, Minnesota: 'Hardy Fruit Gardens.'

PROFESSOR E. J. WICKSON, University of California, Berkeley, Cal.: 'Fruit Gardens of the Pacific Coast.'

MR. G. HAROLD POWELL, pomologist in charge fruit storage investigations, U. S. Department of Agriculture: 'Relation of Cold Storage to Commercial Orchardling.'

DR. C. L. MARLATT, first assistant entomologist, U. S. Department of Agriculture: 'The San Jose Scale in the Orient.' (Illustrated.)

HON. W. A. MCKINNON, chief of Fruit Division, Department of Agriculture, Ottawa, Canada: 'Fruit Inspection and the Export Trade.'

MR. GEO. T. POWELL, Ghent, N. Y.: 'Should the Commercial Grower Plant Varieties of High Quality?'

DR. W. D. BIGELOW, acting chief, Bureau of Chemistry, U. S. Department of Agriculture: 'Pure Food Legislation and its Relation to the Fruit Grower.'

PROFESSOR F. W. TAYLOR, chief, Department of Horticulture, St. Louis, Mo.: 'Pomology at the St. Louis World's Fair.'

DISCUSSION AND CORRESPONDENCE.

THE BAHAMAS VS. TORTUGAS AS A STATION FOR RESEARCH IN MARINE ZOOLOGY.

FROM June 4 to July 27 the writer was in charge of an expedition of the Museum of the Brooklyn Institute of Arts and Sciences which

had for its object the study of the coral reefs and marine zoology of the Bahamas. The writer had already enjoyed the privilege of studying the marine zoology of the Bahamas during the winter months while acting as assistant to Dr. Alexander Agassiz upon the *Wild Duck* expedition of 1892-93.

Having now seen the conditions in the Bahamas in summer as well as in winter, the writer feels justified in drawing a comparison between this region and that of the Tortugas in reference to their comparative advantages as stations for the establishment of a laboratory for research in marine zoology.

Nassau, the capital of the Bahamas, is a clean, healthful city attractively situated upon hills of *æolian* rock and possessed of a good harbor.

The social conditions commonly found in English colonies are here well developed, and one meets with gracious treatment both from the government officials and from the residents of the islands. It is certain that were a laboratory for research in marine biology to be established in the Bahamas, under good auspices, the community would extend a cordial welcome to the investigators and render their sojourn in the colony pleasant in every way.

The harbor of Nassau is a long, narrow trough bordered on the south by the island of New Providence and on the north by Hog and Rose islands. A very strong tidal current sets through it, flowing eastward with the flood and westward with the ebb-tide, the current being of such strength that it is necessary only to anchor in the tide-way and throw over a tow-net in order to make a surface haul under ideal conditions. This is an advantage possessed by but few localities and would enable a laboratory to supply itself with a practically continuous surface haul.

Unfortunately, however, the surface hauls are very poor in comparison with those from the Tortugas. The prevailing winds in the Bahamas during the summer are from an easterly direction, and these drive the surface water into Nassau harbor from over the shallow flats which extend for about seventy-five miles between New Providence and Eleuthera